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## ZOÖLOGY.

AMPHIOXUS IN THE BERMUDAS. — It may interest the readers of *The Naturalist* to hear that *Amphioxus* has been discovered in the Bermudas. Mr. J. Matthew Jones and I have dredged it in the swift tide-way near the bridge at Flatts Village. The animals vary in length from three quarters of an inch to an inch and a half, and appear to be quite abundant in a belt of coarse sand in two to three fathoms of water. — G. BROWN GOODE, Hamilton, Bermuda, April 4, 1877.

THELYPHONUS GIGANTEUS POISONOUS. — Dr. H. C. Yarrow forwarded us in February, 1875, a specimen of this arachnid, with a letter from Dr. J. F. Broughter, of Fort Craig, New Mexico, in which he states his belief that this animal is poisonous, and adds, "I know the Mexicans here regard it as extremely poisonous." He incloses the following extract from a letter of Dr. Lewis C. Kennan, of Santa Fé, N. M.:—

"In regard to the *Thelyphonus giganteus*, I have no doubt of its venomousness; I can demonstrate the poison apparatus. . While stationed at Fort Buchanan, on the border of Sonora, in 1855, I knew an Indian boy bitten on the temple who *never recovered*. Several horses were bitten on the lip, champing the insect in their hay, and the tumefaction and general distress were as great as from the bite of a rattlesnake. The insect is so extremely sluggish that great violence is necessary to make them bite. I had a French servant who frequently brought them to me in his hands and pocket, and I even suspected the omnivorous Gaul of cooking and eating them as a sort of land lobster, but they never troubled him in any way. The belief in their venomousness is universal in Mexico. To my mind the fact is beyond question. If not, what is the teleology of the fangs?"

NEW ENTOMOLOGICAL WORKS. — Bulletin, No. 2, vol. iii., of Hayden's United States Geological Survey of the Territories is a bulky pamphlet of 340 pages, containing three papers with the following titles: Western Diptera: Descriptions of New Genera and Species of Diptera from the Region West of the Mississippi, and especially from California. By C. R. Osten Sacken. Report upon the Insects collected by P. R. Uhler during the Explorations of 1875, including Monographs of the Families *Cydnidæ* and *Faldæ*, and the Hemiptera collected by A. S. Packard, Jr., M. D. By P. R. Uhler. Descriptions of the Araneæ collected in Colorado in 1875 by A. S. Packard, Jr., M. D. By T. Thorell, with an appendix by J. H. Emerton.

We may state what is not mentioned in Professor Thorell's paper, that he found several species of spiders in Colorado, closely allied to North-eastern Asiatic forms. This is confirmatory of our statement in the Monograph of the United States Geometrid Moths, that we found several Colorado moths of this family closely allied to those found on the

plateau of the Altai Mountains. Within a few days we have received a letter from Dr. Standinger, who writes, in acknowledging the receipt of a copy of the monograph, "By the excellent pictures I recognized different North American species as identical with some from Europe or North Asia, described a long time since."

CRITICISMS OF HAECKEL. — There has recently appeared a third edition of Haeckel's *Anthropogenie*, in which he attempts to explain man's origin in accordance with the principles of evolution. He enters into the subject in detail. He has also written a work on the General History of Creation. His agreeable style and polemical skill have secured for these books large sales, so that Haeckel's influence over the public in Germany is very great and has now extended to other countries. He has likewise propounded various theories which have demanded the attention of zoologists. Under these circumstances it becomes a matter of especial interest to learn the opinions of competent critics. All the published criticisms by zoologists of acknowledged high standing with which I am acquainted are unfavorable, while the praises, which the writer personally has heard, were bestowed for the most part by young persons.

Professor Haeckel's book is provided with numerous illustrations. Professor His<sup>1</sup> states that on page 242 of the first edition of the *Schöpfungsgeschichte* there are three figures, one of the egg of man, the egg of an ape, and the egg of the dog, which are referred to in the text as showing the identity of the primordial egg in mammals, but Professor His calls attention to the fact that they are electrotypes of one and the same wood-cut. On page 170 Professor His calls attention to the fact that Haeckel gives figures of an embryo dog and human foetus, the former of which is supposed to present a copy from Bischoff, the latter from Ecker. The forehead in the dog is three and one half mm. longer than in Bischoff's figure, while that of the human embryo is two mm. shorter than the original, and made still smaller by the eye being drawn five mm. further forward, while the tail is twice as long as in the original. Professor Haeckel's figures present the closest similarity with one another.

Professor Bischoff<sup>2</sup> directly contradicts Haeckel's assertion that we cannot discover, even with the aid of the best microscope with the highest power, any essential difference between the egg of man and those of most of the higher mammals, and states that the pictures showing the identity of mammalian embryos in Plate V. of Haeckel's *Anthropogenie* differ essentially from the reality, and, finally, that the figures of apes' faces given by Haeckel on his title-page show a great agreement existing between the features of apes and of the lower human races, but that this resemblance does not appear in photographs.

<sup>1</sup> *Flis Unsere Körperform*. Leipzig 1875. Page 168.

<sup>2</sup> *Sitzun. math. phys Classe der k. b. Akad der Wiss. München*. 1876. Heft i., page 1.

Mr. Balfour<sup>1</sup> also cites Haeckel as having refigured one of his sections, employing a coloration to distinguish the layers, not founded upon Balfour's statements, but on the contrary in direct opposition to them.

Professor Hensen in his article on the Development of the Rabbit, in His and Braune's *Zeitschrift für Anatomie und Entwicklungsgeschichte*, volume i., calls attention to Haeckel's picture of spermatozoa within the yolk of a mammalian egg, a thing which no man had ever seen up to that time.

Professor Semper has openly attacked Haeckel, first in a lecture entitled *Der Haeckelismus in der Zoölogie*, published in Hamburg, in 1876, and again in *Offener Brief an Herrn Professor Haeckel in Jena*, which has just come out. In the latter especially, numerous points are noted, all telling against Haeckel: thus on page 20 he says that Haeckel's figure of a section through an annelid's head is incorrect, because it contains a cardinal vein, genital glands, liver sacks, and segmental organs, and none of these organs exist in the head; the sexual glands are drawn, too, on the dorsal side of the body, whereas they always lie on the ventral side.

Professor Haeckel further makes statements of fact: one of these is that Goethe was an evolutionist. Kossmann, in a pamphlet which I have not at hand, has reviewed the citations from Goethe, and concludes that Haeckel's assertion is false. Oscar Schmidt<sup>2</sup> draws the same conclusion.

Semper in his *Offener Brief*, page 11, affirms that Haeckel's view that the Echinoderms are formed by worm colonies is belied by the facts of anatomy and embryology.

Mecznikow, F. E. Schulze, Oscar Schmidt, and Barrois in their recent investigations on the sponges have questioned the accuracy of Haeckel's observations on the embryology of these animals. But this subject is not thoroughly worked up yet, and Haeckel may be right after all; but we pass to other criticisms.

Mr. Alexander Agassiz<sup>3</sup> condemns the "startling hypothesis of the genetic connection between the Geryonidae and Æginidae, . . . called by Haeckel *allæogenesis*," and propounded in his memoir on the *Rüsselqualen*. Agassiz adds that two short papers, recently published by Schulze and Ulianin, prove conclusively that "Haeckel's theory, like so many other of his vagaries, had no foundation in truth. It was based not merely on an incorrect interpretation of facts, but the facts themselves existed only in his imagination. As perhaps, with the exception of his monograph of the *Radiolaria*, no other memoir has contributed more than the one above quoted to give Haeckel the position he holds among zoölogists, we may be allowed to remind the Haeckelian school of nat-

<sup>1</sup> *Journal of Anatomy and Physiology*, vol. x, page 521, note.

<sup>2</sup> *Deutsche Kundschau*. O. Schmidt. April, 1876, page 95.

<sup>3</sup> *Silliman's Journal*. May, 1876, page 420.

uralists that this same genetic connection has furnished the text for many a sermon from their high priest. Infallible himself, he has been unsparing in his condemnation of the ignorance and shallowness of his opponents. Proved now to be in the wrong, we expect, therefore, justice without mercy from this stern scientific critic, and look forward in the next number of the *Jenaische Zeitschrift* for a thorough castigation of Haeckel by Haeckel, showing up the absurdity of allæogenesis and all that hangs thereby."

Finally, Professor Haeckel has proposed various theories. The most widely known of these is his Gastræa-Theorie. The inspiration of this was the theory of the germinal layers being homologous in all classes of animals. Do not let us confuse matters, but remember that this theory was suggested by Von Baer<sup>1</sup> in 1828, and by Rathke half a century ago. It was brought prominently forward by Kleinenberg in his memoir on Hydra, and then further established by Meeznikow and Kowalewsky, and since by numerous observers.

The Gastræa-Theorie is an attempt to explain these homologies. Claus<sup>2</sup> proves that this is unsuccessfully tried, because it disagrees with the facts in many cases. He further points out that Haeckel has contradicted himself several times flatly in his system of classification.

Haeckel has proposed a biogenetical fundamental law (biogenetisches Grundgesetz), namely, that embryology is the repetition of phylogeny. This is merely a misshapen repetition of the principle taught by Agassiz, that the embryos of higher animals resemble the adults of lower forms. Kölliker<sup>3</sup> demonstrates the falsity of Haeckel's mode of stating the case by noticing some of the conclusions he draws, but which are disproved by facts.

It does not seem to me desirable to continue these quotations and references, for I think that the inaccuracy of Haeckel's pictures, of his statements of facts, and finally of his theories, has been sufficiently indicated. I close with a quotation from Professor His's *Unsere Körperform*, page 171 :—

"I myself have grown up in the faith that among all the qualifications of a naturalist, the only one which cannot be spared is accuracy and an unconditional respect for the truth. At present, also, I still hold the view that the absence of this one qualification tarnishes all others, may they be never so brilliant. Others may, therefore, admire Mr. Haeckel as an active and relentless party leader; in my judgment he has, by his very manner of attack, resigned his right to be reckoned an equal in the circle of serious investigators." — CHARLES SEDGWICK MINOT.

[We should not lose sight of the fact that Haeckel stands as an original investigator far above some of his critics. He has established a dis-

<sup>1</sup> Über Entwicklungsgeschichte der Thiere. Theil I., page 245.

<sup>2</sup> Die Typenlehre und E. Haeckel's sog. Gastræa-Theorie. Vienna, 1874.

<sup>3</sup> Entwicklungsgeschichte. 2te Aufl., page 392.

tinct school in biology. His works on the Monera, the Rhizopoda, the Sponges, Infusoria, Acalephs, etc., besides his masterly drawings and elegant literary style, should be taken into account in judging of his influence on the progress of zoölogy. — ED. NATURALIST.]

NOTES ON THE BEAVER. — Along the banks of the Grand River, Northwestern Colorado, in the year 1874, I had an opportunity of examining the work of a colony of beavers. I was first apprised of the vicinity of these animals by noticing a timber-shoot or clearing scooped out from the willow-brake to the edge of the water. It had the appearance of having been recently used, and the dragging of the logs had hollowed out the channel down to the brink of the stream. Through this slide I passed into a grove composed of slender willows which formed an almost impenetrable thicket. About fifty feet from the river was a circular clearing where the animals had been at work. Here the trees were larger, and many of them had been cut off obliquely within six inches of the ground, almost as nicely as though done with a steel axe. The logs had been hauled away, leaving an opening in the dense thicket. Farther on, larger trees had been felled which were still remaining, the majority of them measuring six and eight inches in diameter, and one tree, which had been completely severed, measured at least fourteen inches. The wood had been gnawed around the circumference, a few inches from the base, the deepest cutting having been done on the side next the water, so that the tree might fall in that direction. A few, however, had been felled so as to fall away from the river, which fact serves to show that these animals are endowed with an instinctive sagacity nearly approaching reason; for if they were guided merely by ordinary animal instinct, no mistakes would be made. Does not the bird build her nest as perfectly the first time as after years of practice? On the contrary, the beaver seems to be benefited by experience, and just as man arrives at proficiency through his mistakes the beaver profits by his errors. I noticed that wherever there were trees which had been felled some time past and fallen in the wrong direction, the newer work had been accomplished, without exception, in a systematic manner, all of the logs being cut so as to fall toward the dam. As I passed along the bank of the stream, I observed about ten timber-shoots, running parallel, at right angles to the course of the current, and separated by about fifteen feet. The larger trees had been cut near the water and above the dam for the purpose of floating them down, to save the labor of dragging from the interior. I must have interrupted them at their work, as some of the cutting was perfectly fresh, and large, damp chips lay profusely around trees which had not been entirely severed. In one place where a tree had been cut almost through, water was dripping from the notch, showing where a beaver had just been at work. I picked up several chunks of wood, six or eight inches in diameter and about as much in length, the ends being obliquely parallel.

These had probably been prepared to fill up chinks in the walls of the dam. The trees had been, for the most part, cut into sections averaging ten feet in length, and the branches and twigs had been trimmed off as cleanly as a wood-chopper could have cut them. Along the banks of the White River, some weeks before, I noticed several artificial canals which had been dug out in the absence of natural side-channels in the river. These were designed for floating down logs. One canal was four feet in width, seven in length, and several feet deep. — E. A. BARBER.

### ANTHROPOLOGY.

CREMATION AMONG THE SITKA INDIANS. — During the writer's residence at Sitka, the capital of Alaska Territory, he had the opportunity of witnessing the interesting ceremony of cremation as performed by the Sitka Indians.

The subject of this solemn rite was the dead body of an old squaw, who was the mother of a numerous progeny. The day fixed for its consummation was the one immediately succeeding her death. About nine o'clock on the morning in question, four of us filed through the wooden stockade that separates the town of Sitka from the Indian village. After threading our way for some distance among the rocks along the beach, and through the filth which invariably surrounds an Indian habitation, we at length reached the dwelling-place of the deceased. As we approached we were greeted by the barking of a dozen or more wolfish-looking dogs. The hut was a substantial one, built of logs so carefully hewn that one could scarcely believe that their smooth surface was not due to the plane of a carpenter. The roof was formed of long, thin slabs, split from spruce or cedar trees, and had but a slight pitch. Immediately over the centre of the house a large rectangular hole was cut in the roof to give egress to the smoke arising from the fire within. To prevent the snow and rain from descending through this opening, a short ridge-pole, held up by two small forks which were fastened, one at each end of the hole, to the main ridge-pole, supported a covering of long slabs whose lower ends rested upon the main roof, while the upper ones projected far enough to screen the interior in a great measure from the uncomfortable effects of the driving storms.

The only entrance was through a circular hole about two feet in diameter, placed about six feet above the ground, and reached by half a dozen steps. Through this hole we had to crawl on our hands and knees, and by a corresponding descent on the inside we reached the floor, which was also made of slabs laid upon the ground, except a place about eight feet cut in the middle where the fire is built.

At the end opposite the door was erected a kind of closet, arranged with shelves, upon which were stored the winter supplies of smoked salmon, seal oil, and dried berries, together with the usual stock of blankets and peltries.